

Virtual Reality within the UITS Advanced Visualization Lab

(for the digital arts & humanities at Indiana University)

Bill Sherman
Advanced Visualization Lab
Indiana University

February 3, 2017

Sherman, Bill. "Virtual Reality within the UITS Advanced Visualization Lab." 16 Sep 2016/3 Feb 2017. Digital Arts & Humanities Workshop Series. Scholars' Commons, Wells Library, Indiana University, Bloomington. Retrieved from: <http://hdl.handle.net/2022/21295>



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Digital Arts and Humanities Workshop Series – Spring 2017

Fridays @ noon -- Scholars Commons IQ-Wall

Date	Topic	Presenter
Jan. 13	Intro to Digital Humanities	Tassie Gniady
Jan. 20	Intro to 3D Visualization for Arts and Humanities	Michael Boyles
Jan. 27	Intro to R	Tassie Gniady
✧ Feb. 03	Virtual Reality	Bill Sherman
Feb. 10	Augmented Reality	Chauncey Frend
Feb. 17	R for Literary Analysis	Tassie Gniady
Feb. 24	IQ-Tables & Touch-Enabled Software Workflows	David Reagan
Mar. 03	R for Twitter Analysis	Tassie Gniady
Mar. 24	3D Scanning and Printing	Jeff Rogers
Mar. 31	3D Photogrammetry	Tassie Gniady
Apr. 07	Network Graphs	David Kloster
Apr. 14	Advanced Media	Chris Eller



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



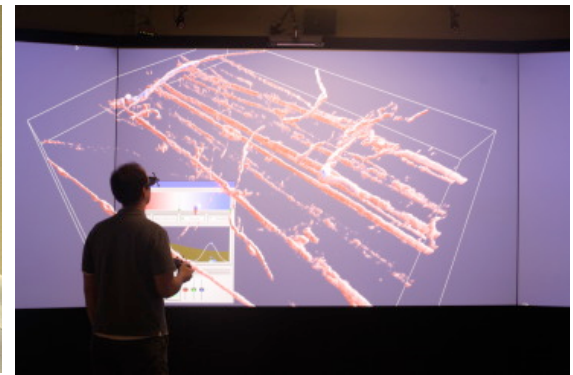
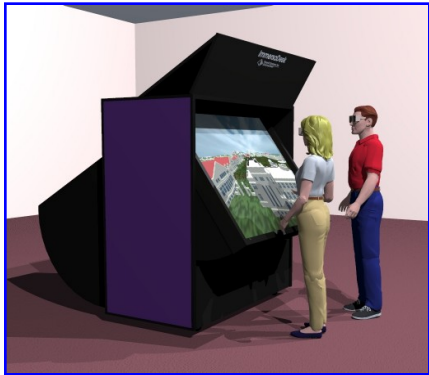
**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Virtual Reality at IU

- AVL established in 1997 – doing VR right out of the gate!
- Now, more than a century of experience in VR!
 - cumulative



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



VR: a definition

- A medium composed of interactive computer simulations that sense the *participant's* position and actions, and replace or augment the feedback to one or more senses, giving the feeling of being mentally immersed or being "present" in the simulation.



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE
INSTITUTIONS

INDIANA UNIVERSITY

VR: a definition

- A medium composed of interactive computer simulations that **sense the participant's position and actions**, and replace or augment the feedback to one or more senses, giving the feeling of being mentally immersed or being "present" in the simulation.

➤ Track the user



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE
INSTITUTE

INDIANA UNIVERSITY

VR: a definition

- A medium composed of interactive computer simulations that sense the *participant's* position and actions, and **replace or augment the feedback to one or more senses**, giving the feeling of being mentally immersed or being "present" in the simulation.
 - Track the user
 - **Display to the user**



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE
INSTITUTE

INDIANA UNIVERSITY

VR: a definition

- A medium composed of interactive computer simulations that sense the *participant's* position and actions, and replace or augment the feedback to one or more senses, giving the **feeling of being mentally immersed or being "present" in the simulation.**
 - Track the user
 - Display to the user
 - **Immerse the user**



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE
INSTITUTION

INDIANA UNIVERSITY

Replacing the senses

- Displays coupled to the user's head
- Displays that the user enters
- Displays that the user holds



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services

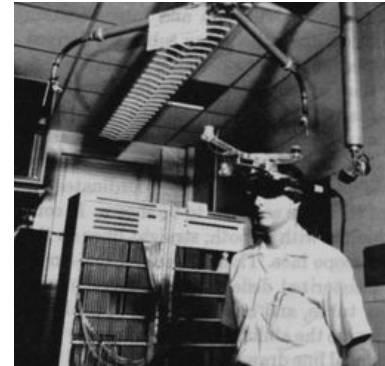


**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY

HMD: Screens coupled to the head

- 1968: invented by Ivan Sutherland at Utah
- 1990's-2000's: research-oriented
- 2012: Oculus Kickstarter funded
- 2016: Oculus Rift / HTC Vive / Playstation VR
- 2017: "Reality Labs" established at IUB



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



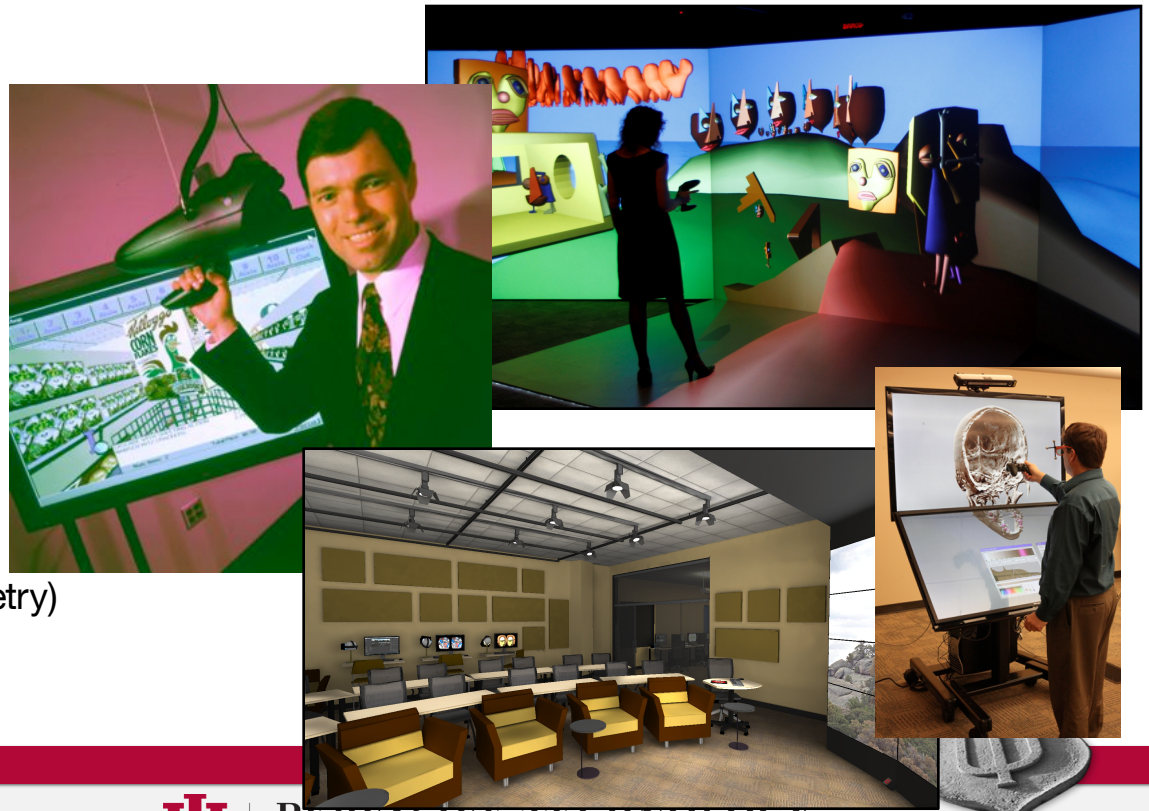
CAVE: Stationary display style VR

- 1991: invented by Sandin/DeFanti at UIC
- 1997: 4-sided CAVE installed at IUB in Lindley Hall
- 2005: AT IUPUI, Virtual Reality Theater installed
- 2010: At IUB, VCT deployed
- 2014: at IUB, Scholars' Commons IQ-wall deployed



VR Projects at IU

- Art:
 - Dolinsky's *Figuratively Speaking*
- Education & Training:
 - Lighting Lab
 - AVML CRC machine
 - *Piazza d'Oro*
 - Dentistry "Stab Lab"
- Visual Simulation:
 - *Lux et Veritas*
- Scientific Visualization:
 - Volumes (Mouse Brain)
 - Point Clouds (LiDAR & Photogrammetry)
- Media/Narrative:
 - IU Sports Experiences



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY

Current VR Tech at IU

- **Campus:**

- IQ-Walls (10+ sites)
- HTC Vive “Reality Labs”

- **Lab:**

- HTC Vive
- Oculus Rift CV1
- Smartphone VR
- PIPES environmental experiences



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



IU Reality Labs



- **Three Way Collaboration:**

- Advanced Visualization Lab (AVL)
- Student Technology Center (STC)
- Local department (e.g. Media School / School of Art and Design)

- **Catalyst:**

- Consumer-priced VR systems
- Marketplace of applications

- **Initial Labs:**

- Kirkwood Hall 016
- Franklin Hall 052
- Fine Arts 215



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



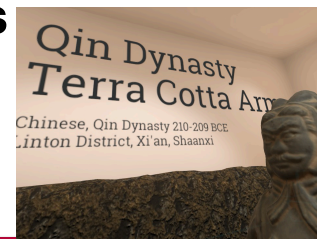
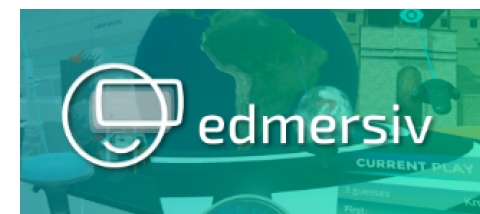
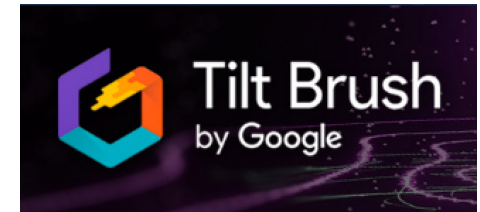
**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



IU Reality Labs

- **Fostering Virtual Reality Usage:**
 - Vetting applications from the marketplace:
 - For use as outreach
 - For integration into IU courses as teaching aid
 - IU content creation:
 - Tools to present student produced media content
 - Tools to create a VR experience from scratch
- **Reality Labs are seeded with ~dozen apps**



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY

Building Experiences / VR Workflows

- **Experience:**

- Assets



- Display



- Interface



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Building Experiences / VR Workflows

- **Experience:**

- Assets

- Hand-modeled (Maya / Rhino)
 - Captured (scanned / photogrammetry / 360 video)
 - Computed (BigRed2 simulation)

- Display

- Large-screen
 - HMD
 - Phone

- Interface

- Delivery (Web / App)
 - Programming (Unity / WebGL / FreeVR)
 - User (Navigation / Interaction)



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



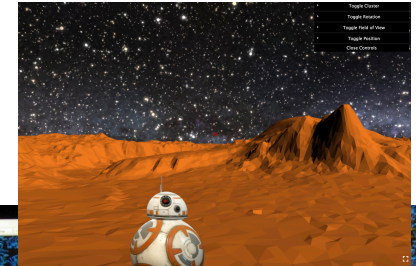
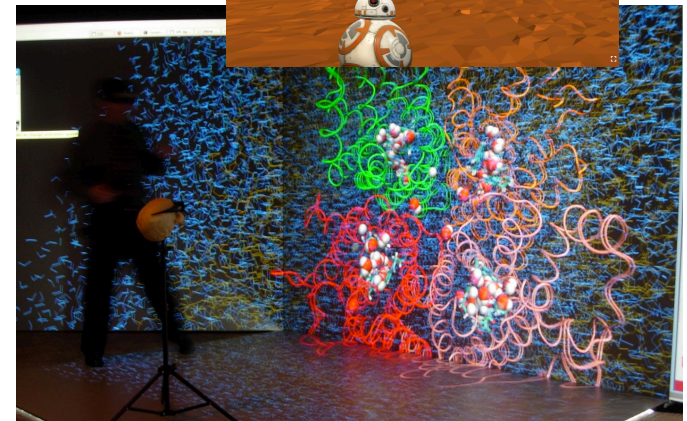
**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



VR Applications

- Art:
 - Prof. Dolinsky and her students
- Education & Training:
 - *Piazza d'Oro*
 - *Star Cluster Experience (also sci-vis)*
- Visual Simulation:
 - *Lux et Veritas*
 - *Global NOC*
- Scientific Visualization:
 - ParaView / VTK
 - Volumes
 - Point Clouds
- Media/Narrative:
 - Cuban Center IU Sports Experiences



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services

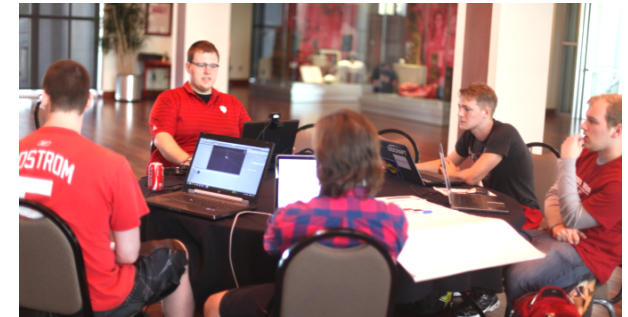


PERVASIVE
INSTITUTE

INDIANA UNIVERSITY

Learning Opportunities

- Academic Classes:
 - Prof. Dolinsky
 - Sherman
 - Chabin
- Workshops & Tutorials:
 - Coming soon: Reality Lab Tools
 - YouTube channel (AVLtube)
 - Group presentations
- Consulting:
 - One on one / small group
- Online Resources:
 - AVL generated
 - AVL curated



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services

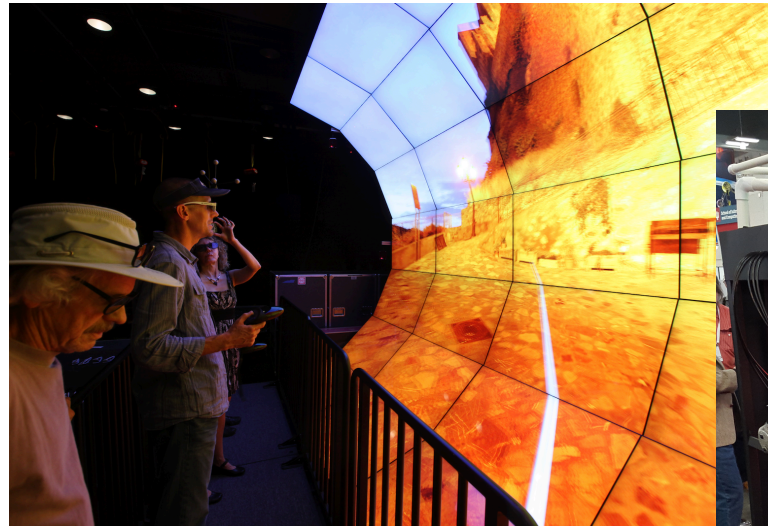


**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY

Crossing the Threshold

- VR in the Classroom:
 - Teaching about VR
 - Teaching with VR
- Collaborating within VR
- IU “Reality Labs”



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



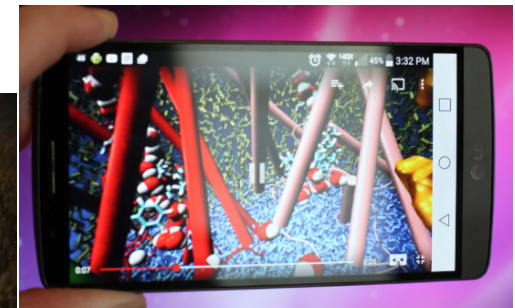
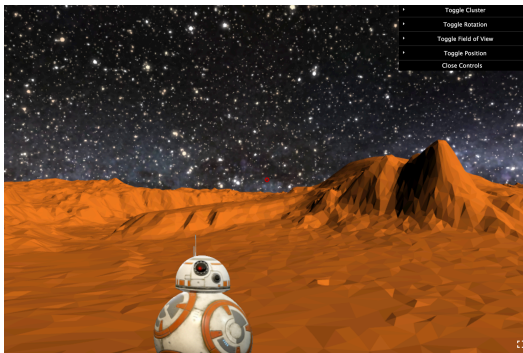
**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



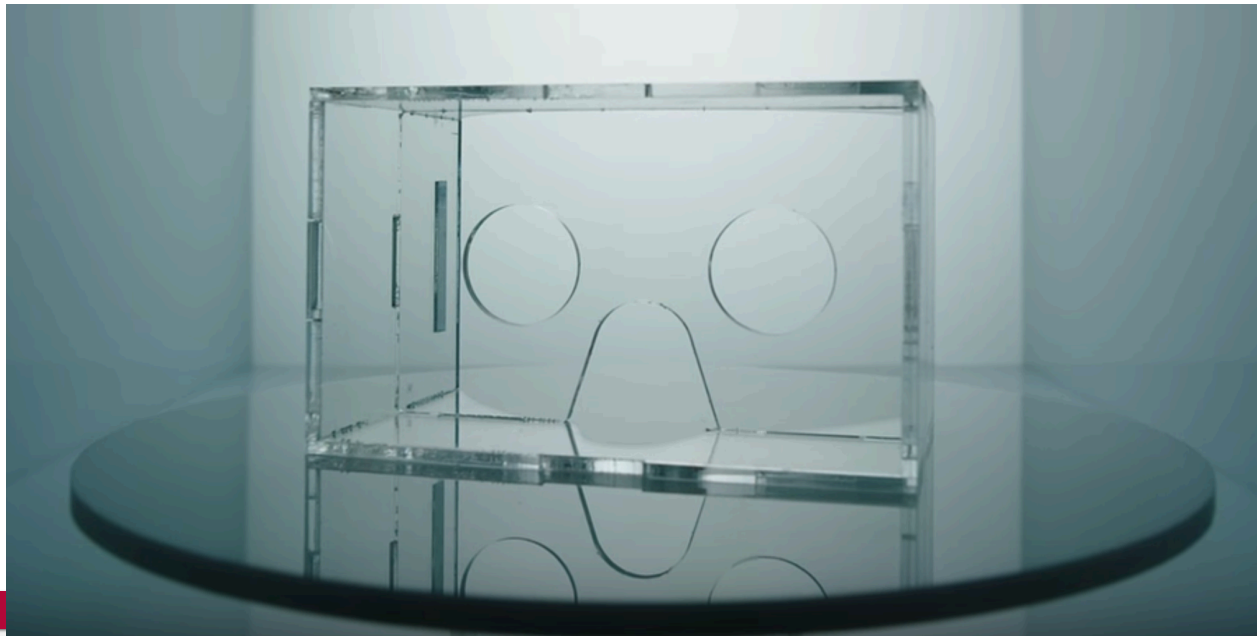
VR Demonstrations

- HMD:
 - *Figuratively Speaking*
 - SketchFab examples
 - Google Earth VR
 - Tilt Brush
- Smartphone:
 - Star-cluster viewer
 - Youtube 360



But First ...

- Google Cardboard ... Plastic!



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Thank You!

Demos & Discussion

- HMD:
 - *Figuratively Speaking*
 - SketchFab examples
 - Google Earth VR
 - TiltBrush
- Smartphone:
 - Star-cluster viewer
 - Youtube 360
 - YouVisit IU 360

Contact Us

Bill Sherman

shermanw@iu.edu

UITS Advanced Visualization Lab

vishelp@iu.edu

<http://avl.iu.edu>



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



License Terms

- Please cite as: [Sherman, William; Virtual Reality within the UITS Advanced Visualization Lab, CyberDH Friday series, September 16, 2016 (and IUScholarWorks handle as appropriate)]
- Items indicated with a © are under copyright and used here with permission. Such items may not be reused without permission from the holder of copyright except where license terms noted on a slide permit reuse.
- Except where otherwise noted, contents of this presentation are copyright 2016 by the Trustees of Indiana University.
- This document is released under the Creative Commons Attribution 3.0 Unported license (<http://creativecommons.org/licenses/by/3.0/>). This license includes the following terms: You are free to share – to copy, distribute and transmit the work and to remix – to adapt the work under the following conditions: attribution – you must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work). For any reuse or distribution, you must make clear to others the license terms of this work.



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY

